b) a light source mounting structure configured to mount the light sources which are arranged on the structure such that the respective directional light distribution patterns and the respective spectral distributions combine to form the overall light distribution pattern calculated to efficiently provide the predetermined surface areas with the design illuminance,

whereby the overall light distribution pattern, subtending greater angles than that of the respective light distribution patterns is produced directly by the multiplicity of light sources without recourse to at least one of non-integral reflectors and refractors.

51 [37] The illuminating device of claim 50 intended for positioning relative to the predetermined surface areas further including apparatus providing the structure an orientation relative to the predetermined surface areas and where in response to said orientation, the multiplicity of light sources is arranged on the structure according to the respective light distribution patterns so that the surface areas are illuminated with the design luminance.

52 [40] The illuminating device of claim 51 further including apparatus uniquely orienting the structure relative to the predetermined surface areas.

53 [New] The illuminating device of claim 51 wherein the respective spectral distributions combine to form the overall light distribution pattern calculated to efficiently provide the predetermined surfaces with the design illuminance and color.

54 [New] The illuminating device of claim 50 wherein the predetermined surfaces are equidistant from the light source and the design illuminance on the respective predetermined surfaces are not equal.

55 [New] The illuminating device of claim 50 wherein the predetermined surfaces are non-equidistant and the design illuminance on the respective predetermined surfaces are equal.

56 [New] The illuminating device of claim 50 wherein any of the design illuminance and color is any of different and similar combinations for respective predetermined surface areas.

57 [38] The illuminating device of claim 51 wherein the design illuminance level is uniform illumination over to at least one of the surface areas and a certain height relative to the surface areas irrespective if the surface area is directly below the illuminating device or off in a distant corner of a room.

58 [39] The illuminating device of claim 51 wherein the design illuminance level is increased task lighting illuminance on certain surface areas and general lighting illuminance level over the rest of the surface areas.

59 [New] The illuminating device of claim 51 wherein the light source is at least one of substantially monochromatic LEDs and white LEDs

60 [42] The illuminating device of claim 51 wherein the illuminating device is a luminaire based on specific lighting application criteria according to principles of correct lighting practice to provide the design illuminance and color such that the luminaire provides a controlled illumination intensity, spectrum, luminous exitance and spatial distribution of intensity and spectrum, suited to the specific lighting application, and optionally where the luminaire design criterion includes any items from the list comprised of: a requirement of maintaining an acceptable continuum of spatial illumination and a requirement of maintaining an acceptable continuum of spatial color effects and the requirement for maintaining an acceptable glare rating for the luminaire.

61[43] The illuminating device of claim 60 wherein the intensity, spectrum, and spatial distribution of intensity and spectrum is adjusted for changes in a living space to be illuminated in accordance with the lighting application comprising:

(a) a means for sensing the changes; and

(b) a means for changing the light emanating characteristics of the light sources, thereby providing the correct intensity, spectrum, and spatial distribution of intensity and spectrum as a function of time.

62 [45] The luminaire of claim 60, further including any items from the list comprised of::

(a) a power connection apparatus in communication with the mains power;

(b) a power supply element providing current at a voltage to the light sources and other ancillary equipment;

(c) a differentiated power supply element capable of varying power to the respective light sources said power supply arranged to effect an independent electric power signal differentiated in voltage, current or frequency to the respective light sources or group of light sources;

(d) a controller for adjusting the power signal to the light sources such that a particular amount of power supplied to the light source generates a corresponding intensity and provides the correct intensity, spectrum, and spatial distribution of intensity and spectrum for the lighting application;

(e) a storage media device capable of storing and recalling stored data relating to performance, algorithms and lighting parameters;

(f) a controller capable of receiving inputs and by means of recalling stored parameters, processing algorithms, and calculating results, generates output control signals to adjust the illuminance according to the correct lighting practice;

(g) a photosensor for providing light spectrum and intensity information to the controller, said information for use in said adjusting;

(h) a motion detector for providing occupant sensing information to the controller, said information for use in said adjusting;

(i) a communications element coupled to the controller comprised of a receiver for receiving a data signal from an external device;

(j) a communications element coupled to the controller comprised of a transmitter for transmitting a data signal to an external device;

(k) a remote control man-machine interface input device capable of communicating data with the communications element;

(l) a machine vision system comprised of an imaging device, and object recognition coupled to the controller and

(m) a mechanical assembly for the support of light sources, power supplies, controllers, sensors and other ancillary equipment;

63 [46] The illuminating device of claim 60, wherein said controller is selected from the list consisting of:

(n) an open-loop controller, factory programmed, for use in general lighting according to correct lighting practice;

(o) an open-loop controller, user-programmed, by use of a programming method taking into account the lighting requirements of the environment in which the luminaire is to be used;

(p) a closed loop controller, user-programmed, by use of a programming method taking into account the lighting requirements of the environment in which the luminaire is to be used;

(q) a closed loop controller user-programmed, by use of a programming method taking into account the lighting requirements of the environment and self-adjusting in response to the changing lighting requirements of the environment in which the luminaire is located;

(r) a closed loop controller, self-adjusting in response to the lighting requirements of the environment in which the luminaire is located, without pre-programming.

64 [47]A method for constructing an illuminating device having an overall light distribution pattern calculated to efficiently provide predetermined surface areas with a design illuminance and color, comprising the steps of:

(a) selecting a multiplicity of light sources having respective spectral distributions and respective directional light distribution patterns which subtend lesser angles than the angle subtended by the overall light distribution pattern, and

(b) mounting said light sources on a structure such that the respective directional light distribution patterns and the respective spectral distributions combine to form said overall light distribution pattern calculated to efficiently provide the predetermined surface areas with the design illuminance,.

whereby the overall light distribution pattern, subtending greater angles than that of the respective light distribution patterns is produced directly by the multiplicity of light sources without recourse to at least one of non-integral reflectors and refractors.

65 [New] The method for constructing an illuminating device of claim 64 intended for positioning relative to the predetermined surface areas further comprising the steps of:

(s) providing the structure an orientation relative to the predetermined surface areas, and

(t) arranging the multiplicity of light sources on the structure in response to said orientation, according to the respective light distribution patterns so that the surface areas are illuminated with the design luminance.

66 [New] The method for constructing an illuminating device of claim 65 wherein the structure is provided a unique orientation relative to the predetermined surface areas.

67 [New] The method for constructing an illuminating device of claim 66 wherein the mounting of the multiplicity of light sources on the structure is through the calculation of Lambert's Law based on the respective light source light distribution patterns and the respective predetermined surface areas design illuminance.

68 [48] The method of claim 64 for a specific lighting application in a predetermined living space further comprising the steps of:

(a) determining the illuminance and spectrum requirements of the lighting application and visual tasks to be carried out within the living space, and

(b) determining an illumination area, distances from the illuminating device of the surfaces within the living space to be illuminated, and